

FENG LIMIN¹ and EVA JUTZELER²

Clouded leopard

Neofelis nebulosa

The clouded leopard *Neofelis nebulosa* is about the size of a small leopard. Males are larger than females. The tail is nearly as long as the head and body, and the legs are short and stout, ending in broad paws. The hind legs are noticeably longer than the front legs. The cat's skull is long and low, with well-developed crests for the attachment of jaw muscles. This feature is probably related to the cat's exceptionally long canine teeth (around 4 cm; Christiansen 2006). On the cat's back and sides the background colour varies from earthy brown to dark grey to pale or rich yellowish brown, or ochre, shading to white or pale tawny on the undersides. Clouded leopard fur is instantly recognizable by its distinctive cloud-shaped markings, which have a dark rim and turn lighter towards the centre and are separated by areas of the paler ground colour. Two intermittent black stripes run down the spine to the tail base and there are six longitudinal stripes on the back. The marking patterns on the coat resemble those of the marbled cat, but the clouded leopard is much larger (Nowell & Jackson 1996, Sunquist & Sunquist 2002).

Most recently the clouded leopard has been split into two distinct species based on genetic and morphological evidence: (1) the mainland clouded leopard *Neofelis nebulosa* which, as its name indicates, is found on the mainland, as well as on large islands such as Taiwan and Hainan, and (2) the Sundaland clouded leopard *Neofelis diardi* which is found only on Borneo and Sumatra. In China only *N. nebulosa* occurs (Buckley-Beason et al. 2006, Kitchener et al. 2006, 2007, Wilting et al. 2007).

Status and distribution

The distribution range of the clouded leopard stretches from the eastern and southern foothills of the Himalayas in Nepal (Dinerstein & Mehta 1989), through Bhutan and India (e.g. Arunachal Pradesh, Mishra et al. 2006; Sikkim; Assam), south to Myanmar, southern China, Taiwan, Vietnam, Laos, Thailand, peninsular Malaysia (e.g. in the Jerangau Forest Reserve, Mohd Azlan & Sharma 2006; in Sabah, Wilting et al. 2006) and Cambodia (Sunquist & Sunquist 2002, IUCN 2010).

The species is widely distributed in China

(Fig. 1) and has been reported to be relatively common in Jiangxi and Anhui in the past (Tan 1984). In addition, it is found south of the Yangtze (Tan 1984, Anonymous 1992), specimens have been collected in southern Fujian (American Museum of Natural History, specimen # 43104), Hubei (Zoologisches Museum Berlin, specimen # 56135) and Hainan (United States National Museum, specimen # 239907), it has been recorded in Jiangxi (Koehler 1991, Sunquist & Sunquist 2002), in central, western and southern Sichuan (Seidensticker & Eisenberg 1984), and in the Namcha Barwa region in Tibet (Qiu & Bleisch 1996). In Taiwan it is most likely extinct (Chiang 2007). Very little is known about the clouded

leopard's status in the wild, as it is elusive and lives mostly in dense vegetation. Most of the information about the species comes from incidental sightings and interviews of locals and forestry workers (Nowell & Jackson 1996). Different camera trap surveys and two radio telemetry studies have been conducted in different National Parks of Thailand (Austin & Tewes 1999, Grassman et al. 2005, Austin et al. 2007). The main threats in China for the clouded leopard are habitat degradation and illegal hunting. However, its current status in China is poorly known (IUCN 2010). Recently a rough population estimate for Southwest China based on home range size from a telemetry study in Thailand (Grassman et al. 2005) and on camera trap pictures, scat collection and sightings from 2005 to 2007, resulted in a total of 40 individuals for Xishuangbanna Nature Reserve, 20 individuals for Nan-gunhe Nature Reserve, and 10 individuals

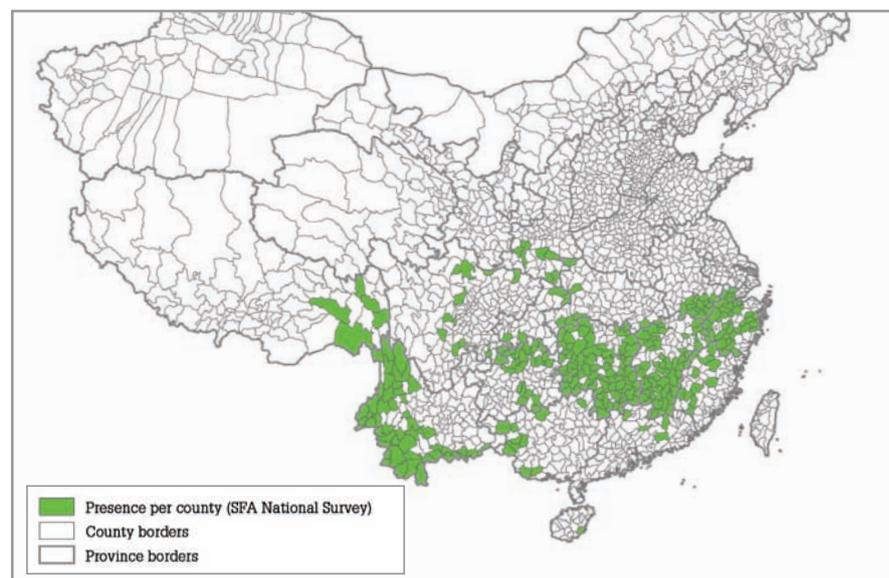
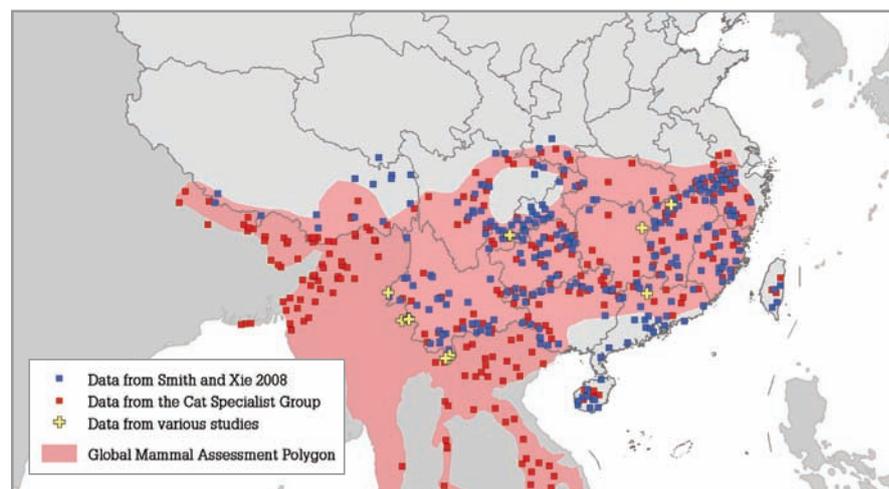


Fig. 1. Distribution of the clouded leopard in China.

for Tongbiguan Nature Reserve. These current estimates amount to a total of some 70 individuals in southern Yunnan. Although this cat has a wide range in southern China, the remaining suitable forest habitats are fragmented and isolated from each other (Nowell & Jackson 1996). Therefore it is assumed that the overall population trend is in decline (IUCN 2010).

Habitat

It apparently occurs in a variety of forest types, but evergreen forests (Fig. 2) are usually said to form the cat's main habitat (Fletcher 2000). Compared to other felids in Southeast Asia the clouded leopard might be more confined to deeper forests (Santia-pillai 1987). In surveys in Yunnan Province in China from 2005 to 2007 (Fig. 2), clouded leopards were sighted or even photographed in tropical evergreen forest (4 individuals), hill evergreen forest (7 individuals) and mixed deciduous forest (1 individual). All individuals were recorded at an altitude of 500-1,300m. In the Himalayan foothills it has been recorded up to 1,450m (Nowell & Jackson 1996).

Ecology and behaviour

Clouded leopards are solitary and mainly nocturnal and crepuscular hunters (Griffiths 1993, Sunquist & Sunquist 2002, Grassman et al. 2005). The clouded leopard is known for its arboreal talents even though it is unclear how arboreal they are in the wild. It can be found hunting in the treetops as well as on the ground (Grassman et al. 2005, Azlan et al. 2009). Home ranges have only been estimated in Thailand. During a study from 1997 to 1999 in the Khao Yai National Park radio-collared clouded leopards had home ranges of 39.4 km² (one female) and 42 km² (one male). Both individuals had a core area of 2.9 km² (95% fixed kernel; Austin et al. 1999, 2007). From April 2000 to February 2003, Grassman et al. (2005) radio-collared 4 individuals in Phu Khieo Wildlife Sanctuary. The home ranges (with a 95% minimum convex polygon) of two females were 25.7 km² and 22.9 km² and of two males 29.7 km² and 49.1 km².

Reproductive data are only known from captive individuals, mostly outside China. Births have occurred from March through August, but animals having a tropical distribution often do not show a well defined reproductive season. They can have between 1 and 5 kittens, but more commonly 2 or 3 kittens are

Neofelis nebulosa

Fact Sheet

Names:

云豹 [yun bao]
clouded leopard

Head and body length:

70-108 cm

Tail length:

55-91.5 cm

Weight:

16-32 kg

Global Population:

<10,000 (IUCN 2010)

Chinese Population:

unknown

Distribution in China:

across S China

IUCN Red List:

Vulnerable C1+2a(i) (2008)

CITES:

Appendix I

China Red List:

EN A1cd

China Key List:

Class I



Photo: A. Sitwa

born. The age of first reproduction is usually between 22 and 36 months. On average they live 11 years, but life spans up to 16 or even 17 years have been recorded in captivity. There is no report about reproduction or life history directly from China (Nowell & Jackson 1996, Sunquist & Sunquist 2002). The only data from the wild were collected by Grassman et al. (2005), who radio-tracked a pregnant female in Thailand and recorded a smaller home-range for several months after giving birth, presumably because the female was caring for her young.

Prey

Among the recorded clouded leopard prey are mainly primates such as pig-tailed macaques, slow loris and gibbons (Thailand; Nowell & Jackson 1996, Grassman et al. 2005); and palm civets and grey leaf monkeys (Malaysia; Sunquist & Sunquist 2002); birds such as pheasants, small mammals such as squirrels, also fish as well as larger prey such as porcupines (Malaysia; Sunquist & Sunquist 2002); deer such as muntjac, and argus (Nepal; Nowell & Jackson 1996); sambar deer, barking deer and mouse deer, also wild boar and bearded pigs (Malaysia; Sunquist & Sunquist 2002); and it has been reported hunting dogs (Sunquist & Sunquist 2002). Among the prey in China, barking deer and pheasants are known (Feng et al.

2008, and unpublished data). They also reportedly prey on poultry but do not appear to eat carrion (Sunquist & Sunquist 2002).

In captivity

Hand-reared clouded leopards are very tame, and in several countries clouded leopards have been taken as pets by private persons (A. Wilting, pers. comm.). In 1990 an European captive breeding programme was established for clouded leopards (Hughes 1991). However, clouded leopards don't easily reproduce in captivity. For instance, less than 20 percent of adult females listed in the International Clouded Leopard Studbook bred successfully (Yamada & Durrant 1989). Within the North American Species Survival Plan population breeding success is poor, and behavioural problems such as fur-plucking, tail-chewing, excessive hiding or pacing, and intersexual aggression resulting in mate killing are common (Wielebnowski et al. 2002). Artificial insemination has been suggested, but has not proven to be a successful solution so far, as the quality of the ejaculates from captive animals is poor (Fletcher 2000, Pukazhenthil et al. 2006).

Main threats

Deforestation and converting land to agriculture or human settlements, as well as target and non-target hunting, are the principal threats. The clouded leopard is widely hunted

purposefully (mostly poisoned) for its teeth, pelt and bones for the Asian medicinal trade (Santiapillai 1987, Sunquist & Sunquist 2002, Shepherd & Nijman 2008). A study in Myanmar suggested that there is very poor law enforcement in the trade in animal parts in general (Shepherd & Nijman 2008). In south-eastern China pelts and bones are sold openly, even though the cat has protected status. Some animals are also captured for live trade (Tan 1984, Sunquist & Sunquist 2002). Other threats within China are human interference and the reduction of its prey base as the meat market increases (Wang et al. 1995b) as well as consumption by humans in local restaurants (Tan 1987b). Habitat restoration is practically non-existent and law enforcement still has to improve.

Protection measures

The clouded leopard is included in CITES Appendix I and protected by national legislation over most of its range. Hunting is banned in

Bangladesh, Brunei, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Taiwan, Thailand and Vietnam, and hunting regulations apply in Laos (Nowell & Jackson 1996, IUCN 2010). Because of the gun ban policy of 1998, hunting was reduced in China and hopes for a recovery of the population have risen. Additionally, even though the forest disappeared rapidly in the past several decades, a number of protected areas have currently been established and most of the remaining forest habitats in south-western China are now within these reserves. The success of anti-poaching patrols within reserves, however, has only been limited so far, because they were not sustained or frequent enough. Some environmental education of local schoolchildren and adults has taken place in order to improve public awareness of the species. A common research approach focusing on the tiger, the clouded leopard and the leopard has also been suggested, since all three species share the same habitat in some

areas. Thus, the most interesting places for surveys are tiger areas, for example within Fujian, Jiangxi and Zhengjiang Province. Camera trapping surveys have been conducted in the Nangunhe Nature Reserve in 2005 (Fig. 2) and in the Xishuangbanna Nature Reserve from 2006-2007. However, there is still a lack of basic ecological information and more surveys and research projects should be conducted.

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Fig. 2. From top to bottom: Evergreen broad-leaved forests are among the typical clouded leopard habitats. Camera trap pictures of a clouded leopard taken in May and June 2005 in the Nangunhe Nature Reserve in southwest Yunnan, China (Photos Beijing Normal University).